

### IN THE CLAIMS

Please amend the claims as follows:

1. (Canceled)
2. (Currently Amended) A package comprising:
  - one of a thin-core and coreless substrate of an integrated circuit printed circuit board [[IC-PCB]] carrier package; and
  - an Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] mounted to the substrate, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] including a side wall portion to mount transverse to the substrate and a stiffener extension to extend from the side wall portion toward a center of the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]].
3. (Currently Amended) The package as claimed in claim 2, the package being one of a pinned grid array [[PGA]], and a ball grid array [[BGA]] carrier package.
4. (Currently Amended) The package as claimed in claim 2, the package being one of a flip chip pin grid array [[FC-PGA]], and a flip chip ball grid array [[FC-BGA]] carrier package.
5. (Currently Amended) The package as claimed in claim 2, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] substantially made of a thermally conductive material in a form of one of a molded, stamped, etched, extruded and deposited Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]], wherein the thermally conductive material withstands temperatures of at least normal integrated circuit [[IC]] operation.
6. (Previously Presented) The package as claimed in claim 2, wherein the stiffener extension is substantially planar and mounted to a substantially planar die-side surface of the substrate.

7. (Currently Amended) The package as claimed in claim 2, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] having an internal cavity therein to provide clearance for at least one of a die, underfill, and die side component [[(DSC)]] .
8. (Currently Amended) The package as claimed in claim 2, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] having separate multiple attachment parts.
9. (Currently Amended) The package as claimed in claim 2, having a mountable above-substrate cavity-height which is one of equal to, and greater than, an above-substrate height, of a mounted integrated circuit die [[(IC-die)]] .
10. (Currently Amended) An Integrated Heat Spreader / Integrated Stiffener [[(IHS/IS)]] mountable to one of a thin-core and coreless substrate, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] including a side wall portion to mount transverse to the substrate and a stiffener extension to extend from the side wall portion toward a center of the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]], the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] having a mountable bottom surface of the stiffener extension which is substantially co-planar with and mounted to a top die-side surface of the substrate.
11. (Currently Amended) The package as claimed in claim 2, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] being mountable to support a heat sink.
12. (Currently Amended) The package as claimed in claim 2, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] having an integrated cooling structure.
13. (Currently Amended) The package as claimed in claim 2, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] being electrically connected to the substrate.
14. (Currently Amended) The package as claimed in claim 2, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] being electrically insulatable from the substrate.

15. (Currently Amended) An Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] as claimed in claim 10, the integrated stiffener portion being an edge/ring stiffener mountable to minor-planar side surfaces of the substrate.

16. (Currently Amended) An Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] as claimed in claim 10, the integrated stiffener portion being an edge/ring stiffener having a non-flat cross section mateable with side surfaces of the substrate.

17. (Canceled)

18. (Canceled)

19. (Currently Amended) A carrier package as claimed in claim 22, the package being one of a pinned grid array [[(PGA)]] and a ball grid array [[(BGA)]] carrier package.

20. (Currently Amended) A carrier package as claimed in claim 22, the package being one of a flip chip pin grid array [[(FC-PGA)]] and a flip chip ball grid array [[(FC-BGA)]] carrier package.

21. (Currently Amended) A carrier package as claimed in claim 22, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] substantially made of a thermally conductive material in a form of one of a molded, stamped, etched, extruded and deposited Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]], wherein the thermally conductive material withstands temperatures of at least normal integrated circuit [[(IC)]] operation.

22. (Currently Amended) A carrier package comprising:  
one of a thin-core and coreless substrate of an integrated circuit printed circuit board (IC-PCB) [[IC-PCB]]; and

an Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] mounted to said substrate, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] including a side wall portion to mount transverse to the substrate and a stiffener extension to extend from the side wall portion toward a center of the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]], the stiffener extension comprising an integrated stiffener extension which is substantially planar and mounted to a substantially planar die-side surface of the substrate.

23. (Currently Amended) A carrier package as claimed in claim 22, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] having an internal cavity therein to provide clearance for at least one of a die, underfill, and die side component [[(DSC)]]].

24. (Currently Amended) A carrier package as claimed in claim 22, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] being attached as multiple parts.

25. (Currently Amended) A carrier package as claimed in claim 22, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] having an above-substrate cavity height which is one of equal to, and greater than, an above-substrate plane-height of an integrated circuit die [[(IC-die)]]].

26. (Currently Amended) A carrier package as claimed in claim 22, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] having a bottom surface which is substantially coplanar with a top surface of a combination of an integrated circuit die [[(IC-die)]] with interface material.

27. (Currently Amended) A carrier package as claimed in claim 22, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] having a support portion to support a heat sink.

28. (Currently Amended) A carrier package as claimed in claim 22, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] having an integrated cooling structure.

29. (Currently Amended) A carrier package as claimed in claim 22, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] being electrically connected to the substrate.
30. (Currently Amended) A carrier package as claimed in claim 22, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] being electrically insulated from the substrate.
31. (Currently Amended) A carrier package as claimed in claim 22, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] having an edge/ring stiffener mounted to minor-planar side surfaces of the substrate.
32. (Currently Amended) A carrier package as claimed in claim 22, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] having an edge/ring stiffener having a non-flat cross section, mated with side surfaces of the substrate.
33. (Canceled)
34. (Canceled)
35. (Currently Amended) A packaged integrated circuit [[(IC)]] as claimed in claim 38, the carrier package being one of a pin grid array [[(PGA)]] and a ball grid array [[(FC-BGA)]] carrier package.
36. (Currently Amended) A packaged integrated circuit [[(IC)]] as claimed in claim 38, the carrier package being one of a flip chip pin grid array [[(FC-PGA)]] and a flip chip ball grid array [[(FC-BGA)]] carrier package.
37. (Currently Amended) A packaged integrated circuit [[(IC)]] as claimed in claim 38, where the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] is substantially made of a thermally conductive material in a form of one of a molded, stamped, etched, extruded and deposited Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]], wherein the thermally

conductive material withstands temperatures of at least normal integrated circuit [(IC)] operation.

38. (Currently Amended) A packaged integrated circuit [(IC)] comprising:  
an integrated circuit printed circuit board [(IC-PCB)] carrier package including one of a thin-core and coreless substrate; and

an Integrated Heat Spreader / Integrated Stiffener [(IHS/IS)] including a side wall portion to mount transverse to the substrate and a stiffener extension to extend from the side wall portion toward a center of the Integrated Heat Spreader / Integrated Stiffener [(IHS/IS)], the stiffener extension comprising an integrated stiffener extension which is substantially planar and mounted to a substantially planar die-side major planar surface of the substrate.

39. (Currently Amended) A packaged integrated circuit [(IC)] as claimed in claim 38, the Integrated Heat Spreader / Integrated Stiffener [(IHS/IS)] having an internal cavity therein to provide clearance for at least one of a die, underfill, die-side component [(DSC)].

40. (Currently Amended) A packaged integrated circuit [(IC)] as claimed in claim 38, the Integrated Heat Spreader / Integrated Stiffener [(IHS/IS)] having multiple attached parts.

41. (Currently Amended) A packaged integrated circuit [(IC)] as claimed in claim 38, the Integrated Heat Spreader / Integrated Stiffener [(IHS/IS)] having an above-substrate cavity-height which is one of equal to, and greater than, an above-substrate height of a mounted integrated circuit die [(IC-die)].

42. (Currently Amended) A packaged integrated circuit [(IC)] as claimed in claim 38, the Integrated Heat Spreader / Integrated Stiffener [(IHS/IS)] having a bottom surface which is substantially co-planar with a top surface of a combination of an integrated circuit die [(IC-die)] with interface material.

43. (Currently Amended) A packaged integrated circuit [[IC]] as claimed in claim 38, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] having a support portion to support a heat sink.

44. (Currently Amended) A packaged integrated circuit [[IC]] as claimed in claim 38, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] having an integrated cooling structure.

45. (Currently Amended) A packaged integrated circuit [[IC]] as claimed in claim 38, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] being electrically connected to the substrate.

46. (Currently Amended) A packaged integrated circuit [[IC]] as claimed in claim 38, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] being electrically insulated from the substrate.

47. (Currently Amended) A packaged integrated circuit [[IC]] as claimed in claim 38, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] being an edge/ring stiffener mounted to minor-planar side surfaces of the substrate.

48. (Currently Amended) A packaged integrated circuit [[IC]] as claimed in claim 38, the Integrated Heat Spreader / Integrated Stiffener [[IHS/IS]] being an edge/ring stiffener having a non-flat cross section mated with side surfaces of the substrate.

49. (Canceled)

50. (Canceled)

51. (Previously Presented) A heat spreader/stiffener device comprising a thermally conductive member having a side wall portion and a stiffener portion mountable to one of a thin-core and coreless substrate, the stiffener portion to extend from the side wall portion toward a

center of the heat spreader/stiffener device and having a stiffener extension bottom surface being substantially planar to facilitate mounting to a substantially planar die-side surface of the substrate, the heat spreader/stiffener device having a thermal path thermally connectable to the substrate.

52. (Previously Presented) A heat spreader/stiffener as claimed in claim 51, the heat spreader/stiffener having a hollow frame shape to allow clearance for other components on the substrate.

53. (Previously Presented) A heat spreader/stiffener as claimed in claim 51, the heat spreader/stiffener mountable to support a heat sink.

54. (Previously Presented) A heat spreader/stiffener as claimed in claim 51, the stiffener portion being an edge/ring stiffener extension mountable to minor planar side-surfaces of the substrate.

55. (Canceled)

56. (Currently Amended) An integrated circuit [[(IC)]] carrier package as claimed in claim 57, the carrier package being one of a pinned grid array [[(PGA)]] carrier package and a ball grid array [[(BGA)]] carrier package.

57. (Currently Amended) An integrated circuit [[(IC)]] carrier package comprising:  
an integrated circuit [[(IC)]];  
at least one of a thin-core and coreless substrate; and  
a heat spreader/stiffener device with a thermally conductive member having a side wall portion and a stiffener portion mounted to the substrate to increase the substrate stiffness, the stiffener portion to extend from the side wall portion toward a center of the heat spreader/stiffener device, the heat spreader/stiffener device having a thermal path thermally



connected to the substrate, a stiffener extension bottom surface being substantially planar and mounted to a substantially planar die-side surface of the substrate.

58. (Currently Amended) An integrated circuit [[(IC)]] carrier package as claimed in claim 57, the heat spreader/stiffener device having a hollow frame shape to allow clearance for other components on the substrate.

59. (Previously Presented) A carrier package as claimed in claim 57, the heat spreader/stiffener having a portion to support a heat sink.

60. (Previously Presented) A carrier package as claimed in claim 57, the stiffener portion being an edge/ring stiffener extension mounted to minor planar side-surfaces of the substrate.

61. (Canceled)

62. (Currently Amended) An electronic system as claimed in claim 66, the integrated circuit [[(IC)]] carrier package being one of a pinned grid array [[(PGA)]] carrier package and a ball grid array [[(BGA)]] carrier package.

63. (Previously Presented) The package as claimed in claim 2, the stiffener extension extending from a lip of the substrate towards a center of the substrate.

64. (Previously Presented) A carrier package as claimed in claim 22, the stiffener extension extending from a lip of the substrate towards a center of the substrate.

65. (Previously Presented) An electronic system as claimed in claim 66, the stiffener extension extending from a lip of the substrate towards a center of the substrate.

66. (Currently Amended) An electronic system comprising:  
an integrated circuit [[(IC)]] carrier package including an integrated circuit [[(IC)]];

at least one of a thin-core and coreless substrate; and

a heat spreader/stiffener device with a thermally conductive member having a side wall portion and stiffener portion mounted to the substrate so as to increase the substrate stiffness, the stiffener portion to extend from said side wall portion toward a center of the heat spreader/stiffener device and mounted to a substantially planar die-side surface of the substrate, the heat spreader/stiffener device having a thermal path thermally connected to the substrate.

67. (Previously Presented) The package as claimed in claim 2, wherein the die-side surface of the substrate is opposite a pin-side surface of the substrate.

68. (Currently Amended) The package as claimed in claim 2, wherein a combination of an integrated circuit die [[IC-die]] with interface material is mounted between the top die-side surface of the substrate and a main portion of the heat spreader/integrated stiffener.

69. (Previously Presented) The package as claimed in claim 2, wherein the integrated stiffener extension has a bottom surface that is substantially coplanar with and mounted to the die-side surface of the substrate.

70. (Previously Presented) A package comprising:

one of a thin-core and a coreless substrate; and

a heat spreader/stiffener device mounted to the one of the thin-core and the coreless substrate, the device comprising:

a main portion extending along the substrate;

a first side wall portion coupled with the main portion and extending between the main portion and the substrate; and

a first stiffener portion mountable to the substrate so as to increase a stiffness thereof, the first stiffener portion extending from the first side wall portion toward a center of the heat spreader/stiffener device, the first stiffener portion having a stiffener extension bottom surface being substantially planar to facilitate mounting to a substantially planar die-side surface of the substrate.

71. (Previously Presented) The package of claim 70 wherein the device includes:

a second side wall portion coupled with the main portion and extending between the main portion and the substrate, wherein the second side wall portion is on the opposite end of the main portion from the first side wall portion; and

a second stiffener portion mountable to the substrate to increase a stiffness thereof, the second stiffener portion extending from the second side wall portion toward the center of the heat spreader/stiffener device, the second stiffener portion having a stiffener extension bottom surface being substantially planar to facilitate mounting to the substantially planar die-side surface of the substrate.

72. (Previously Presented) The package of claim 71 wherein the device includes third and fourth side wall portions coupled with respective third, and fourth stiffener portions.

73. (Previously Presented) The package of claim 72 wherein the first, second, third, and fourth stiffener portions form a substantially rectangular window footprint.

74. (Previously Presented) The package of claim 72 wherein the first, second, third, and fourth stiffener portions form a rectangular window footprint with curved edges.

75. (Previously Presented) The package of claim 72 wherein the first, second, third, and fourth stiffener portions form four corner stiffening portions, each having a triangular footprint.

76. (Previously Presented) The package of claim 70 wherein the first stiffener portion extends toward the center of the device, and extends away from the center of the device.